

far smaller percentage of fire-damp than any lamp will detect may be the source of the gravest danger in the presence of coal-dust, and we hope that, in subsequent issues, the Home Office will see its way to lay the strongest possible stress upon this fact. The average pitman is only too prone to believe that anything which the Home Office does not distinctly declare to be dangerous, must be absolutely safe, and every care should be taken to dispel so fatal a confidence.

#### FLIES AS CARRIERS OF INFECTION.<sup>1</sup>

THE reports referred to below include the results obtained in the further investigations concerning flies as carriers of infection. These are considered under the following heads:—(1) observations on the ways in which artificially infected flies (*Musca domestica*) carry and distribute pathogenic and other bacteria, by Dr. G. S. Graham-Smith; (2) summary of literature relating to the bionomics of the parasitic fungus of flies (*Empusa muscae*), by Mr. Julius Bernstein; (3) note as to work in hand, but not yet published, and as to proposed further work in reference to flies as carriers of infection, by Dr. S. Monckton Copeman, F.R.S.

Dr. Graham Smith gives the results of an elaborate series of experiments in connection with the rôle which house-flies are supposed to play in the dissemination of disease. He has proved conclusively (a) that in artificially infected flies non-spore-bearing pathogenic bacteria do not survive on the legs and wings for more than a few hours (five to eighteen); (b) that these bacteria (a) frequently survived within the crop for several days, and usually for a longer period in the intestine; (c) that the faeces and regurgitated fluids ("vomit") often contain the organisms (a) in considerable numbers, and that they may remain infective for varying periods; (d) that "the only spores (*B. anthracis*) with which experiments were made survived on the legs and wings, in the crop and intestine, and also in the faeces, for many days.

His somewhat premature conclusions regarding naturally infected flies are that cultures of pathogenic organisms may occasionally be obtained from them, but that this does not "afford conclusive evidence that such flies are a frequent source of disease in man by infecting food materials." Several of the photographic illustrations accompanying this memoir are extremely poor and of little scientific value.

Dr. Bernstein's contribution consists of a short résumé of the literature relating to the fungus *Empusa muscae* (Cohn).

Dr. Monckton Copeman has elaborated an excellent organisation for the elucidation of the question as to the range of flight of house-flies, and trials will also be made of the respective value of various baits that have been proposed from time to time for attracting and killing flies. The results of these investigations will doubtless prove of great value, and materially assist in the methods of controlling this ubiquitous pest.

#### REPORTS OF METEOROLOGICAL OBSERVATORIES.

MADRID OBSERVATORY (1902-5).—The meteorological observations for these four years are included in one volume (recently published). The data for each year are divided into three sections:—(1) daily observations and monthly means; (2) monthly and annual summaries, with differences from normal values; (3) daily sunshine observations, with monthly and yearly summaries. This volume completes the series of these valuable observations, which for subsequent years have been published in yearly volumes. The observations call for no special remark, except that they appear to have been very carefully made, and that full information of instruments and methods is supplied. The average amount of sunshine during the four years was 66 per cent. of the possible amount, as compared with twenty-five years' normal of 44 per cent. at Jersey.

<sup>1</sup> Further Reports (No. 3) on Flies as Carriers of Infection. Reports to the Local Government Board on Public Health and Medical Subjects (new series, No. 40). Pp. 48+7 plates. (London: Printed for His Majesty's Stationery Office, 1910.) Price 9d.

Royal Magnetic and Meteorological Observatory, Batavia (1907).—The observations include hourly readings and results, and a list of the earthquakes and tremors registered by Milne's seismograph and Ehlert's horizontal pendulum. The mean temperature of the year was 26.0° C., which is practically normal. The month with highest mean of daily maximum was October, 31.0° C., and that with lowest mean minima August, 22.6° C. The absolute maximum was 34.5°, in October; minimum, 20.4°, in June. The mean magnetic results were:—declination, 0° 52.21' E.; horizontal intensity, 0.367105 (C.G.S.); dip, 30° 55.17' S.; vertical force, 0.219877 (C.G.S.). A new series of observations of upper clouds was started in 1907, and the observatory is cooperating with the Zürich astronomical observatory for the observation of sun-spots. A regular service of kite and balloon ascents has also been recently established.

Odessa Observatory (1908).—The meteorological observations for this year have been published by Prof. B. V. Stankevitsch, who has been appointed director in the place of Prof. Klossovsky. In addition to the usual observations for the year, a useful summary of the results for 1870-1908 is given. The mean annual temperature is 50.2°; January 26.6°, July 73.8°; absolute maximum, 96.4° in July, minimum, -18.8° in February. The average number of days of frost is 91. The average annual rainfall is 15.98 inches; the wettest year, 24.62 inches, the driest, 8.97 inches. The greatest fall in one day was 3.1 inches. An appendix contains an account of magnetic determinations made by the director in the summer of 1908 in the governments of Smolensk and Kaluga.

Mysore, Rainfall Registration (1909).—The tables show monthly, seasonal, and yearly values for stations and districts, also averages extending over many years. The values for 1909, and average annual values, are also exhibited on maps. The rainfall of 1909 was very favourable as compared with that for 1907 and 1908. For the whole province, the year's aggregate was 42.44 inches, being 5.50 inches, or 15 per cent., above the normal. On the whole, the excess was greatest in January, caused by a cyclonic storm crossing the south of the peninsula to the Arabian Sea. The greatest falls in twenty-four hours were 11.10 inches in Shimoga district (July 12) and 13.96 inches in Kadur (June 6).

#### ASSOCIATION OF TECHNICAL INSTITUTIONS.

THE eighteenth annual conference of the Association of Technical Institutions was held at the Stationers' Hall on February 10 and 11. Sir Henry Hibbert, the president for the forthcoming year, delivered his address in the afternoon of Friday. In the course of the address he pointed out that modern labour conditions render it difficult for a boy to learn every branch of his trade. It is therefore necessary that workshop practice should be supplemented by the technical school. Day training classes must be developed in order that those who are to take the leading positions in great industrial concerns—the master, his sons, managers, and foremen—may be scientifically equipped, but the bulk of the provision of technical education must be made by and through evening classes. He would like to extend the day-school life—no boy to leave school before the age of fourteen, and then to have a part-time system up to seventeen. Students should not be allowed to specialise too early. He would make preparatory classes compulsory before students were allowed to join trade classes. To avoid irregularity of attendance, employers of labour must be got thoroughly in sympathy with the organised efforts of education authorities. Conditions have changed since the time when a man could say he had succeeded without education. The education provided at the secondary schools under the regulations of the Board of Education is not that required by children who are able to remain at school for a limited period prior to entering on industrial pursuits. For these special schools are required. He believed that British employers are not awakening to the necessity of strengthening their producing power by the employment of highly skilled workmen.

The first part of the meeting on the Saturday morning was occupied in a severe criticism of the Board of Education. The association has frequently had to complain in previous years of the late issue of the regulations, but this last time the Board issued the regulations only just before the commencement of the session, and at the same time it suddenly insisted upon the substitution of a new and complicated system of registration for the system which had previously been used by local authorities throughout the country. Strong letters of protest were sent by the council of the association to the Board, and at the meeting on Saturday a discussion upon the subject was opened by Mr. Crowther (Halifax), who pointed out that the multiplication of registers which the Board's regulations required rendered accurate registration almost impossible, and it appeared as though they considered educational efficiency a matter of small moment so long as statistics were obtained. Other speakers followed, all condemning the Board's action, and the meeting unanimously passed a resolution approving of the action of the council and of the request made by the council that the Board should receive a deputation upon the subject.

During a discussion which followed upon the Course System, speakers from different parts of the country showed that, by insisting upon the junior students taking properly organised courses, although at first there was usually some diminution in the number of individual students, this was more than compensated for by the better work and the greater regularity of attendance which always followed. Very striking statistics were furnished by more than one speaker. Mr. Reynolds, of Manchester, said that local education authorities, who bore not only the lion's share of the expense, but the lion's share of the hard work, would not submit to the Board's ukase in these matters. Local effort was the very essence of success in educational administration. He had no sympathy with the idea that a boy or girl who had been irregular in attendance at one class of a particular course should be required to discontinue the whole course. The difficulties and exigencies of life were such that it was often very difficult for boys and girls to maintain a continuous attendance. Educationists must fight for the principle that boys and girls between the ages of fourteen and seventeen should work a limited number of hours a week in order that they may be able to continue the education which up to the age of fourteen had cost the country so much. He was strongly opposed to insisting upon any rigid course system in the case of adult students. At a school of technology there were so many varieties of students that it was impossible to force them into courses. Several other speakers emphasised this point of view, and at the close of the discussion the following resolution was moved by Dr. Clay and carried unanimously:—

"While it is desirable that, as a rule, young students should be required to take systematic courses of study, the enforcement of similar courses in the case of adult students is strongly to be deprecated, and a large discretion should be left in the case of all courses, so that special conditions and local circumstances may receive due consideration."

The members of the association were entertained at luncheon by the Stationers' Company on Friday, February 10. The master acted as host, and proposed the toast of the Association, to which Dr. Glazebrook, the retiring president, replied. Sir Philip Magnus, in proposing the toast of the Board of Education and Local Education Authorities, remarked upon the great development of the Board's work which had occurred during the time in which Sir Robert Morant had been in charge, which he said had increased by some four-fold. Sir Robert Morant, and Mr. Hastings Jay, the chairman of the London County Council Education Committee, replied.

#### PROGRESS OF THE SMITHSONIAN INSTITUTION.<sup>1</sup>

DURING the past year the institution's activities have been increased to some degree by gifts for the promotion of certain special lines of study, particularly in biological research. Among the important works that

might be undertaken, I would especially direct attention to the great advantage to the United States and to the world that would result from the establishment of a national seismological laboratory under the direction of the Smithsonian Institution.

#### Proposed National Seismological Laboratory.

The immense destruction of life and property by certain large earthquakes emphasises the importance of investigations which may lead to a reduction of the damage of future earthquakes. The science of seismology is in its infancy, and it is not always evident what lines of investigation will yield the most important results, hence the importance of developing larger knowledge of seismology in all directions. As an example: It was not at all realised that the accurate surveys of the Coast and Geodetic Survey in California would demonstrate that the great earthquake there in 1906 was due to forces set up by slow movements of the land which have probably been going on for a hundred years. We have learned that slow movements of the land must precede many large earthquakes, and monuments are now being set up in California to enable us to discover future movements of the land, and thus to anticipate future earthquakes. This, I think, is the most important step so far taken toward the prediction of earthquakes.

Seismological work is too large to be prosecuted successfully by the universities, but requires some central office under Government supervision to encourage theoretical and observational studies and to collect and study information from all available sources. The seismological laboratory would serve as a clearing house for the whole country. It would also be the link to connect seismological work in the United States with the work done in other parts of the world.

The work of the laboratory would thus be:—(1) Collection and study of all information regarding earthquakes in the United States and its possessions. The preparation of maps showing the distribution of earthquakes and their relation to geological structure. (2) The study of special regions which are subject to frequent earthquakes to determine, so far as possible, where future earthquakes are likely to occur. (3) The study of the origins of earthquakes occurring under the neighbouring oceans. (4) An organisation of commissions to study in the field the effects produced by large earthquakes. (5) The study of proper methods of building in regions subject to earthquakes. This will require experiment. (6) The improvement of instruments for recording earthquakes. (7) Other theoretical studies. (8) The dissemination of information regarding earthquakes by bulletins or otherwise.

#### Smithsonian African Expedition.

In the last report there was given an account of the setting out of the expedition to Africa in charge of Colonel Theodore Roosevelt, and of the results accomplished prior to June 30, 1909. This expedition, which was entirely financed from private sources through contributions by friends of the Smithsonian Institution, landed at Mombasa on April 21, 1909, and arrived at Khartoum on March 14, 1910. The collections made by it reached Washington in excellent condition, and are now deposited in the National Museum. The series of large and small mammals from East Africa is, collectively, probably more valuable than is to be found in any other museum of the world. The series of birds, reptiles, and plants are also of great importance, and the study of the material representing other groups will furnish interesting results. Colonel Roosevelt reports on the work of the expedition as follows:—

"We spent eight months in British East Africa. We collected carefully in various portions of the Athi and Kapiti plains, in the Sotik and around Lake Naivasha. Messrs. Mearns and Loring made a thorough biological survey of Mount Kenya, while the rest of the party skirted its western base, went to and up the Guaso Nyero, and later visited the Uasin Gisbu region and both sides of the Rift Valley. Messrs. Kermit Roosevelt and Tarlton went to the Leikipia Plateau and Lake Hannington, and Dr. Mearns and Kermit Roosevelt made separate trips to the coast region near Mombasa. On December 19 the expedition left East Africa, crossed Uganda, and went down the White Nile. . . .

<sup>1</sup> From the report of the Secretary of the Smithsonian Institution, Dr. C. D. Walcott, for the year ending June 30, 1910.